



Higher Technology Institute  
10<sup>th</sup> Of Ramadan City  
Biomedical Engineering Department

# ELECTRONICS (2)

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## First Lab: Using Some Laboratory Devices

### ❖ Material required

1) power supply



2) function generator



3) oscilloscope



❖ **Objectives:**

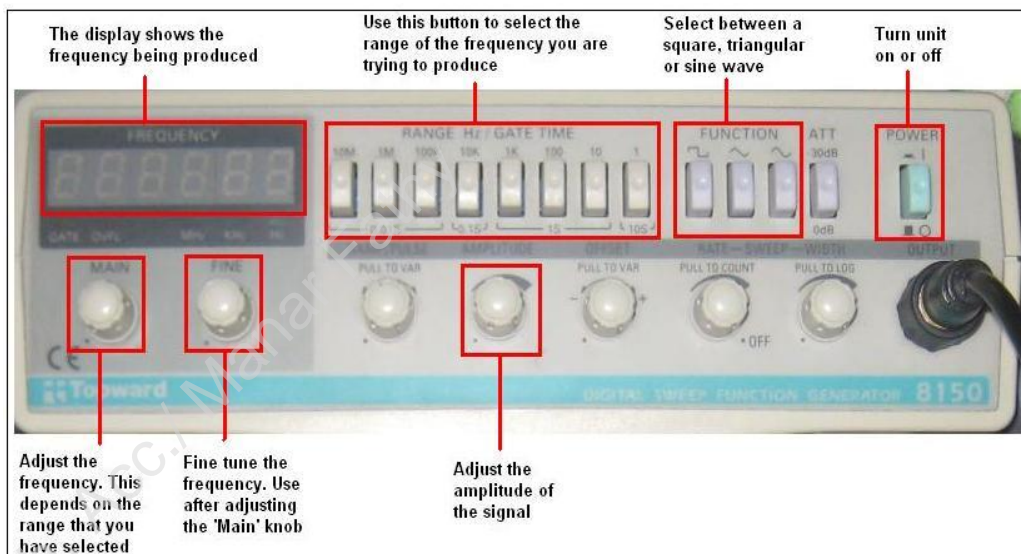
1) Learn how to use Laboratory Devices.

❖ **Procedure:**

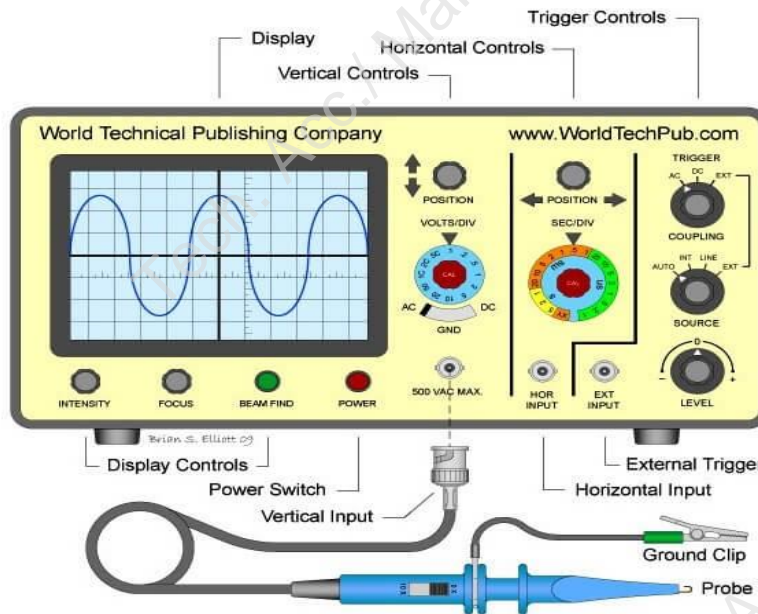
power supply parts and how to use them



function generator parts and how to use them



function oscilloscope parts and how to use them



### ❖ Results:

The student can will know Laboratory Devices parts and how to use them

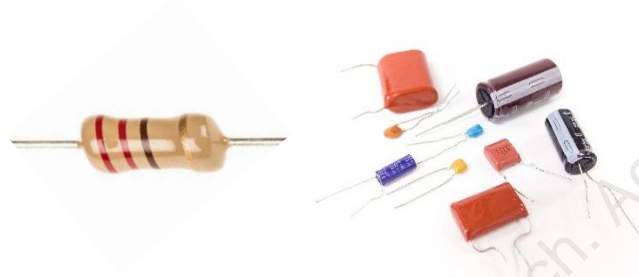
## Second Lab: Common Emitter Circuit

### ❖ Material required

1) Transistors



2) Resistances and capacitors



3) power supply



4) function generator





## 5) oscilloscope

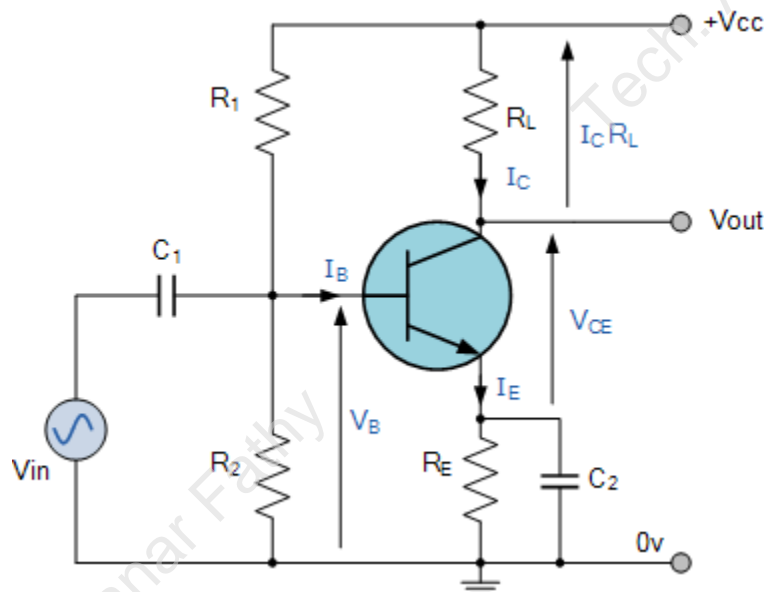


### ❖ Objectives:

- 1) Know the Characteristics of The Common Emitter Amplifier circuit.

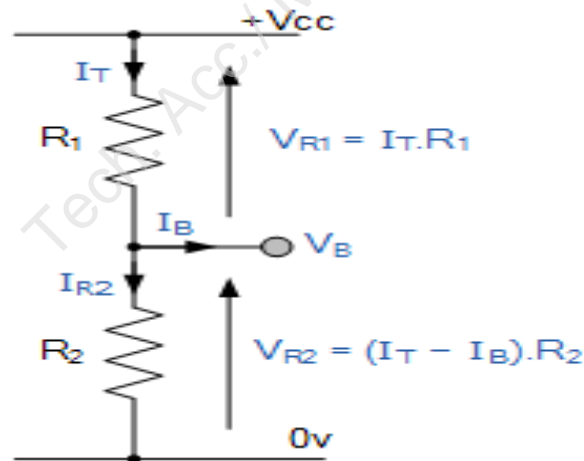
### ❖ Procedure:

The most common amplifier configuration for an NPN transistor is that of the Common Emitter Amplifier circuit



The single stage common emitter amplifier circuit shown above uses what is commonly called “Voltage Divider Biasing”. This type of biasing arrangement uses two resistors as a potential divider network across the supply with their center point supplying the required Base bias voltage to the transistor. Voltage divider biasing is commonly used in the design of bipolar transistor amplifier circuits.

voltage divider network This method of biasing the transistor greatly reduces the effects of varying Beta, ( $\beta$ ) by holding the Base bias at a constant steady voltage level allowing for best stability.



The quiescent Base voltage ( $V_b$ ) is determined by the potential divider network formed by the two resistors,  $R_1$ ,  $R_2$  and the power supply voltage  $V_{CC}$  as shown with the current flowing through both resistors. Then the total resistance  $R_T$  will be equal to  $R_1 + R_2$  giving the current as  $i = V_{CC}/R_T$ . The voltage level generated at the junction of resistors  $R_1$  and  $R_2$  holds the Base voltage ( $V_b$ ) constant at a value below the supply voltage. The potential divider network used in the common emitter amplifier circuit divides the supply voltage in proportion to the resistance.

#### ❖ Results:

The student learns The Common Emitter Amplifier circuit has a resistor in its Collector circuit. The current flowing through this resistor produces the voltage output of the amplifier. The value of this resistor is chosen so that at the amplifiers quiescent operating point, Q-point this output voltage lies halfway along the transistors load line.



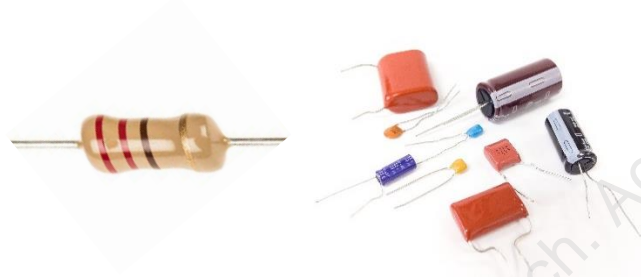
## Third Lab: Multistage Circuit

### ❖ Material required

6) Transistors



7) Resistances and capacitors



8) power supply



9) function generator



## 10) oscilloscope

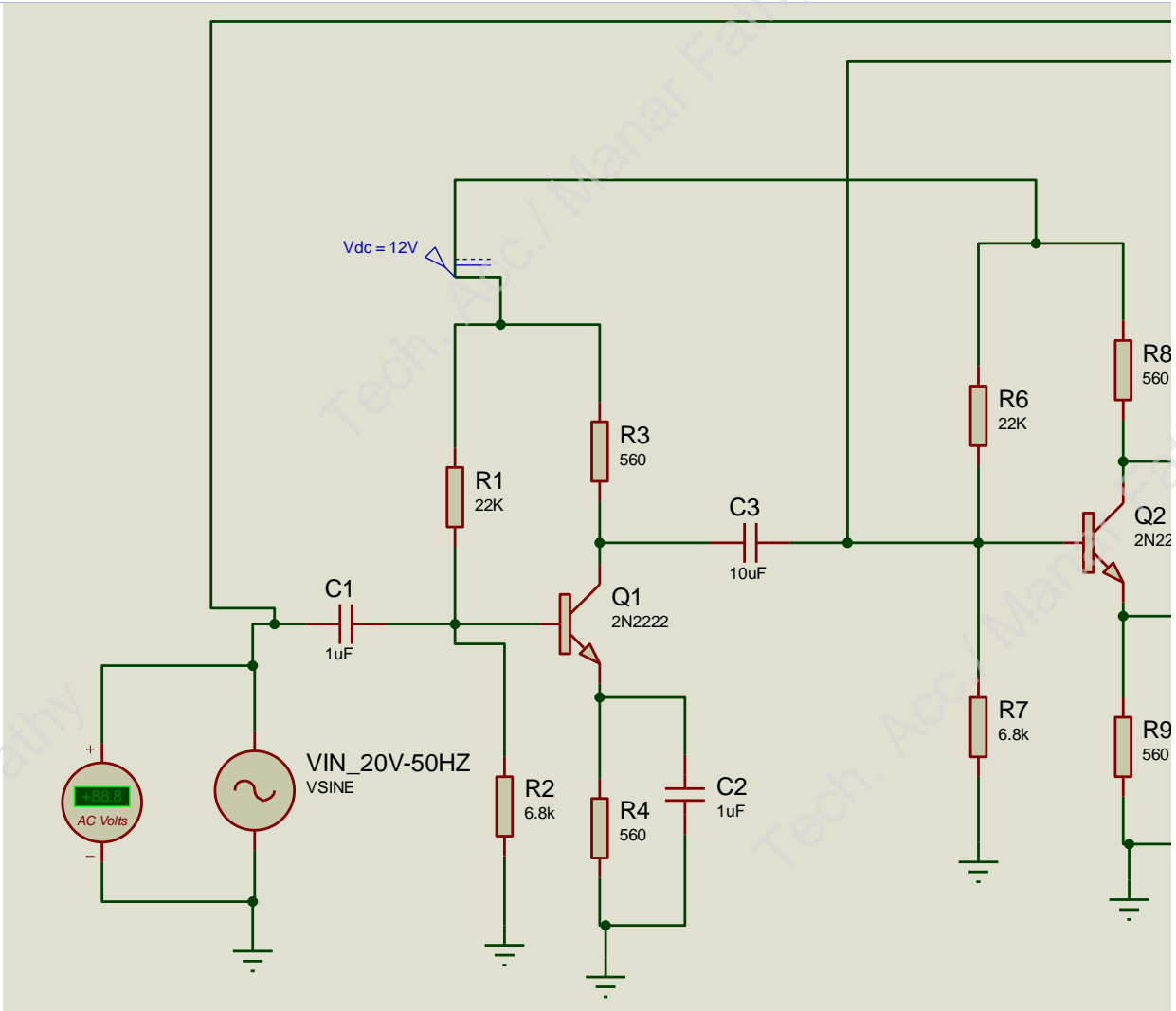


### ❖ Objectives:

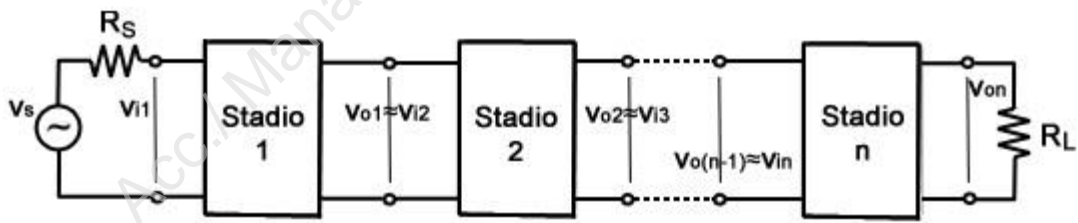
2) Know the Characteristics of Multistage Circuit.

### ❖ Procedure:

A multistage amplifier is an electronic amplifier consisting of two or more single-stage amplifiers connected. In this context, a single stage is an amplifier containing only a single transistor (sometimes a pair of transistors) or another active device.



The multistage amplifier applications are it can be used to increase extremely weak signals to utilizable levels. The distortion can be reduced by changing the signal within stages. At present, any electronic device can process digital or radio electrical signals by including a multistage amplifier.



❖ **Results:**

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The student learns that:

CC Amplifier

Its voltage gain is less than unity.

It is not suitable for intermediate stages.

CB Amplifier

Its voltage gain is less than unity.

Hence not suitable for cascading.

CE Amplifier

Its voltage gain is greater than unity.

Voltage gain is further increased by cascading.

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